

and which has no resemblance to the sternal lip of the larger Arachnida.

These generalities upon the anatomy of the Gamasidæ show how much justification we had to regard this family as the first in the order Acarina, and as establishing the transition between the class Arachnida and that of insects.—*Comptes Rendus*, December 6, 1875, p. 1135.

*On the Presence in existing Seas of a Type of Sarcodaria of the Secondary Formations.* By M. P. FISCHER.

Thirty years ago Quenstedt noticed \*, under the name of *Dendrina*, some excavations of unknown origin observed by him in the most superficial layers of the *Belemnitellæ* of the Chalk. These were so imperfectly defined that the German author questioned whether they were not due to a morbid alteration of the test of the *Belemnitellæ*.

The *Dendrinæ* of Quenstedt remained long comparatively unknown. Morris approximated them to the *Talpinae*, which I regard provisionally as perforations of fossil Bryozoa or Hydrozoa; Pietet and other palæontologists attributed them (I do not know why) to Annelids; Etallon established a distinct order for these excavations, and thought he could describe several species of *Dendrina* from the Jurassic formations, species characterized solely by the general form of the perforations.

By examining the *Dendrinæ* of the test of *Belemnitella*, I ascertained, by means of solution of carmine, that there existed a manifest osculum at which each *Dendrina* opened, and that these oscula were not without resemblance to the efferent orifices or proctides of the sponges of the genus *Cliona*. It was therefore probable that the *Dendrinæ* were related to the sponges.

An unexpected discovery has just furnished fresh materials for the elucidation of this question. Shells dredged at a depth of 25–90 fathoms in the Bay of Biscay showed perforations of existing animals which I could not but regard as allied to those described in the fossil state by Quenstedt. Soon afterwards the same fact recurred in shells from the Mediterranean and the Indian Seas, and I acquired the certainty that the *Dendrinæ* still exist in nearly all the seas of the globe, and that they present the same characters and have the same perforating habits as those which riddled the fossil shells of the Secondary formations with their perforations.

If we examine with a lens the outer surface of some coloured shells (*Pecten*, for example), small, opaque, irregular, lobulated whitish spots may be observed; these are *Dendrinæ*. A rounded orifice terminates a tolerably wide oblique canal, and forms a communication between the exterior and the cavity of the perforating animal. The orifice is single, and resembles the large oscula or efferent apertures of the *Clionæ*; the lobules also are probably in

\* Petrefactenkunde Deutschl. Cephal. Taf. xxx. fig. 36.

communication with the ambient liquids by exceedingly delicate canals starting from their periphery, a certain number of which open at the surface of the perforated shells. On this hypothesis these canals would represent the afferent apertures of the *Clionæ*.

In thin plates of shells the perforations of the *Dendrinæ* are seen to be composed of more or less numerous irregularly branched vacuoles, which are inflated here and there, but retain throughout a pretty wide diameter. The youngest are ovoid or lageniform.

Although the size of the *Dendrinæ* is variable, it is rare for an individual from the French coast (*Dendrina europæa*, Fisch.) to attain 0·8 millim.; generally the maximum diameter is 0·6–0·7 millim. The large osculum measures 0·07 millim., and the lobules vary between 0·06 and 0·08 millim. in diameter. I have counted from 60 to 80 individuals of *Dendrina* upon a surface of 1 square centimetre of the shell of *Pecten opercularis*.

When a *Dendrina* is highly magnified, a quantity of minute canals are seen to start from the periphery of the lobules and penetrate the perforated shell in all directions. These canaliculi are cylindrical, rectilinear, slightly dilated near their point of emergence, truncated at their extremities. Sometimes some are a little wider than the others, or slightly curved. Each canaliculus seems to have a distinct origin; there are no anastomoses or bifurcations; the interior is filled with a brownish organic material. Their length is from 0·03 to 0·06 millim., and their diameter from 0·0010 to 0·0015 millim. It may be supposed that sarcodic processes more or less analogous to the pseudopodia of the Rhizopods pass into these canaliculi.

I have been unable to ascertain the existence of spicules in the interior of the *Dendrinæ*, even with a power of 500 diameters. We see no trace of the siliceous plates or corpuscles which consolidate the surface of the *Clionæ* and *Rhoosæ*.

The *Dendrinæ* cannot be confounded with young *Clionæ*. The latter have a more or less rounded initial chamber of much larger dimensions; in a more advanced stage the excavations of the *Clionæ* are united to each other by narrow canaliculi, and several oscula open at the surface of the perforated body, whilst in the *Dendrinæ* there exists only one principal orifice, at which the canal penetrating into all the lobules terminates.

The size of the *Clionæ* is only limited by the extent of the perforated body; sometimes, even, the *Clionæ*, which have commenced their work of destruction at various points, become confounded into a mass by a process to which I have given the name of *aggregation by coalescence*. The dimensions of the *Dendrinæ* are comparatively limited, and hardly vary more than those of the existing Foraminifera. This last character, with the presence of the peripheral canaliculi and the absence of spicules, leads me to regard the *Dendrinæ* as a peculiar type of perforant Sarcodaria more nearly related to the Rhizopods than to the Sponges.—*Comptes Rendus*, December 6, 1875, p. 1131.